PATENT

IN THE SPECIFICATION

Please amend paragraph 0004 of the specification as follows:

[0004] In wireless communication systems, a pilot signal is sometimes transmitted from a transmitter unit to a receiver unit and can be used to assist the receiver unit to perform a number of functions. For example, the pilot signal can be used at the receiver unit for synchronization with the timing and frequency of signals transmitted by the transmitter unit, estimation of the quality of the wireless communication channel, coherent demodulation of a data transmission, determination of which specific transmitter unit having the best communication link to the receiver unit, estimation of the highest data rate supportable the wireless channel, and other uses.

Please amend paragraph 0007 as follows:

[0007] A technique used to improve operation of the communication system in a multipath environment is a rake receiver. A ~~rack~~ rake receiver includes multiple processing "fingers" and each received multipath signal instance of sufficient strength may be assigned to, and processed by, a respective finger processor. Each finger of the rake receiver processes the assigned multipath signal ~~instances~~ instance, in a manner complementary to that performed at the transmitter unit, to recover a pilot signal and traffic data from the signal received over a multipath communication channel.

Please amend paragraph 0031 as follows:

[0031] A modulator 214 in the base station 102 receives coded pilot and traffic signals from the transmit data processor 212, and further processes the received data to generate modulated data. For some CDMA systems, processing by the modulator 214 includes: (1) covering the coded pilot and traffic signals with different channelization codes and thereby channelizing the pilot and traffic signals onto their respective channels; and (2) spreading the channelized pilot and traffic signals. In IS-95 and cdma2000 the channelization codes are Walsh codes, and in W-CDMA the channelization codes are orthogonal variable spreading factor (OVSF). Scrambling codes are complex pseudo-noise (PN) sequences used to spread the transmitted signal across a wider bandwidth. In IS-92 and cdma2000 the scrambling codes used

by a particular base station are at a fixed phase offset from scrambling codes used by other base stations so that a receiver can distinguish one base station form another. In W-CDMA a different unique, scrambling ~~codes~~ code is used by each base station. "Covering" with a Walsh code in IS-95 and cdma2000 is equivalent to "spreading" with an OVSF code in W-CDMA, and "spreading" with the PN sequence in IS-95 and cdma2000 is equivalent to "scrambling" with a scrambling sequence in W-CDMA.

Please amend paragraph 0044 as follows:

[0044] As shown in Figure. 3, the in-phase and quadrature complex samples, I_{IN} and Q_{IN} respectively, from the receiver [[352]] 252 are provided to a number of finger processors 310a through 310z. Within each finger processor 310 assigned to process a particular multipath instance, the I_{IN} and Q_{IN} samples are provided to a PN despreader 320, which also receives the same scrambling code that was used to spread the data at the base station. The scrambling code provided to the PN despreader 320 is generated in accordance with the particular CDMA standard being implemented and with a particular chip offset, or phase, of the base station to which the chip offset of the multipath instance being processed by that finger processor 310 will be aligned.

Please amend paragraph 0057 as follows:

[0057] Equation (3) illustrates that the best, or optimal, estimate of the channel fade, $\hat{\beta}_{opt}$, at any time is a weighted linear combination of the past as well as the future observed $x(k)$. In other words, an infinite non-causal FIR filter would result in an optimal estimate for the channel. The weights for the optimal filter depend on the channel auto-correlation, R_β, and the noise variance, σ^2. Again, under the assumptions and based on Clark's well ~~know~~ known model, the normalized auto-correlation function of the channel can be given as:

$$R(\tau) = J_0(2\pi f_D \tau) \qquad \text{Eq. (4)}$$

where J_0 is the Bessel function of the first kind of order 0. and f_D is the Doppler frequency shift given by:

$$f_D = \left(\frac{v}{c}\right) f_c \qquad \text{Eq. (5)}$$

where v is the velocity of the mobile WCD, c is the speed of light, and f_c is the carrier frequency. Thus, as illustrated, there is a direct correlation between the velocity of the mobile WCD and the filter estimate that is based on the filter coefficients. Typically, the pilot filter will be implemented as a finite impulse response (FIR) or an infinite impulse response (IIR) filter. While implementation of an infinite non-causal FIR filter may not be practical, many CDMA systems implement FIR filters with multiple taps.

Please amend paragraph 0058 as follows:

[0058] Figure 4 is a block diagram of an embodiment of a pilot filter constructed in accordance with the invention. For example, the pilot filter illustrated in Figure 4 can be used to implement the pilot filter 336 illustrated in Figure[[.]] 3, and includes a FIR filter 410 coupled to a control unit 420. The FIR filter 410 receives and filters the pilot symbols, x_n, in accordance with a particular filter response and provides the filtered pilot ~~symbols~~ estimates, y_n. The particular response of the FIR filter 410, and thus the bandwidth, is determined by a set of coefficients, w_0^k through w_{N-1}^k, provided by the control unit 420.

Please amend paragraph 0059 as follows:

[0059] Within the FIR filter 410, the received pilot symbols, x_n, are provided to a set of series-coupled delay elements 412b through 412m. The received pilot symbols, x_n, and the outputs of the delay elements 412b through 412m are respectively provided to multipliers 414a through 414m, which also receive coefficients w_0^k through w_{N-1}^k respectively. Each of the multipliers receive the pilot symbol, or a delayed version of the pilot symbol, and multiplies the pilot symbol with the received coefficient and thereby provides a scaled symbol to a summer 416. The summer 416 adds the scaled symbols from all the multipliers to provide the filtered pilot ~~symbol~~ estimate, y_n. The filtered pilot symbol from the FIR filter 410 may be expressed as:

$$y_n = \sum_{i=0}^{N-1} w_i^k \cdot x_{n-i} \quad . \qquad \text{Eq. (1)}$$

Please amend paragraph 0066 as follows:

[0066] Each filter 510a through 510n receives and filters the pilot symbols x_n and provides filtered pilot ~~symbols~~ estimates y_n^1 through y_n^N to a selector 512. The selector 512 then provides the filtered pilot ~~symbols~~ estimates from the specific filter having the best, or desired, performance as selected by controller 516. The controller 516 receives estimates of the noise power from noise power estimator 424, and estimates of the WCD's velocity from velocity estimator 426. Based on the values of the noise estimate and velocity estimate the controller 516 will select the desired filter output. In another embodiment, the controller selects the desired filter coefficients based on the velocity estimate without reference to a noise power estimate.